Anthropometric assessment in children under 2 year in Torosk, a rural area of Sabzevar, Iran 2004-6

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Abstract: Introduction: Growth and development is one of the most complicated and significant issues in man's life. Growth monitoring is one of the main sources of information in diagnosing growth disorder and malnutrition in children. The present study was made to study the status of anthropometric indices in under two-year children in Torosk village, Sabzevar, Iran. **Method**: This cross-sectional study was done in 2007. The data of height, weight and head circumference of the children less than 24 months in 2004, 2005 and 2006 were collected through health files. The economic and social status of the families of these children was also evaluated. The statuses of growth of these children were compared with third, fifth and nine-seventh growth standard NCHS percentile. Growth percentile was calculated with SPSS 15 software and the diagrams were drawn by Excel software. **Results:** 135 children were studied in this research, (47.4% girls and 52.6% boys). Most parents were in low levels of education and none had academic education. The economic status of the studied families was low.19.2% of newborn and 53.3% infants were below the third weight for age curve. 7.7% of newborn and 13.3% of infants were below third percentile of height standard. But head circumference did not exceed 8% in nobody. As the age of these children increased, the weight and height percentiles went farther from their corresponding standard percentiles. This was more evident beyond 12 months of age. **Conclusion**: The status of weight and height of under- two year children compared with NCHS standard is inappropriate and gets worse in 12 months of age and after that. **[**Akaberi Arash, Hashemian Masoumeh, Assarroudi Abdolghader, Hasanpour Kazem. **Anthropometric assessment in children under 2 year in Torosk, a rural area of Sabzevar, Iran 2004-6.** *Life Sci J* 2012;9(4):1753-1758] (ISSN:1097-8135). http://www.lifesciencesite.com. 267

Keywords: Children, Growth Pattern, Anthropometrics

Introduction

Growth and development is among the most complicated and significant issues of the man's life. These two separate and at the same time related issues are the indicators of a living being's progress in both quality and quantity aspects (1). Growth assessment is one of the most important information sources in diagnosing growth disorder and malnutrition in children (2). Generally by the word growth, we mean quantity changes that cause increase in size in all dimensions of the infant. These changes are usually measured by centimeter and inch (for height) kilogram or pounds (for weight) (3).

General speaking, growth and development are influenced by two genetic and environmental factors .Genetic factors like ethnic specifications are fixed but environmental factors like nutrition, diseases infection and toxication can be controlled (4). Several studies on human biology have indicated that environmental factors specially the quantity and quality conditions of nutrition have the most influence on physical growth (4). Therefore the role of nutrition is the most significant among the environmental factors. Malnutrition accompanied with infectious diseases is the cause of death of seven million kids under 5 years old in developing countries every year(4). On time diagnosis of growth disorder followed by on time prevention and treatment will be effective.

Failure to thrive or FTT refers to the growth below expected based on weight, height and head circumference(5). In another definition, FTT refers to the weight lower than the third percentile on growth standard curve or weight lower than 80% of average weight to height(5, 6). Children growth disorder is one of nutritional heath issues in Iran .It is a multidimensional problem caused by organic and non-organic or both(7). National Center of Health Statistics (NCHS) announced that 226 million children in the world do not enjoy a favored growth. It is also estimated that about 67 million children have a low weight/height ratio and the weight of about 183 million children is not suitable for their age and the risk of death in low weight children is 2 to 8 times more than the children who have a normal weight for their age (8). The national studies made in recent years show that FTT in urban and rural children under 5 years old is still high. 15.4% of the children under 5 years old suffer from nutritional shortness (nutritional short stature), 10.9% are in moderate and severe low weight and 4.9% are thin(7). The results of a study published under title

the status of children nutrition in the country shows that the children in Iran have a favorable growth from the time of birth up to their five months .however 80% of them face drop in growth after that(7).

The most common method of measuring children' growth is measuring anthropometric indices(9). Today in most parts of the world assessing physical growth and health is done through simple indices like height and weight(10).

The main source of evaluating growth is growth curves; the majority of them are taken from indices of modern countries like United States (For instance NCHS) or WHO(11). Since such indices may not reflect racial, social and economic differences, using local and regional growth curves are recommended(2).

Therefore by considering the importance of continuous evaluation of growth as a quantitative variable and also, being flexible growth pattern during time and based on the report of the health network on the number children's unsuitable growth who live in Torosk village, the present study aimed to evaluate the quality and children's pattern of growth with age of up to two years in Torosk village in 2004-2006.

Method

This cross-sectional study was done in 2007. The data was gathered from statistics gathered from all health files of the children. The data gathered from the files contained demographic data of mothers including age, marriage age, education and job as well as the baby's gender, his or her place in the family ,height, weight and head circumference from the birth up to 24 months of age. It should be noted that these children have referred to health center up to 24 months of age.

The criteria for being studied: The children whose age were less than 24 months in years 2004, 2005 and 2006 and have lived in the village during this period . The criteria for leaving the study included evident anomalies, newborn growth disorders and digestive diseases. The method of gathering data of weight, height and head circumference inserted in the children health files were recorded and measured as follows. Seca scale made in Germany with accuracy of 100 gr. was used for measuring weight and the children had the least clothes without shoes. The box was used for measuring height and a normal tape was used for measuring head circumference. The employee working in Torosk health center was not changed within the last 10 years before the study started and all the measurements were done by the same person during this period. The economic status of the children' families as well as the food materials available in their homes were also evaluated in the study. The basis for comparing the children growth in this study was NCHS standard. The third, fifth and 97th percentiles of growth (height, weight and head circumference) of the children were compared with their counterpart NCHS standard. The height and weight diagrams were drawn for these percentiles. Moreover, the diagram of the ratio of children below third percentiles of standard NCHS was also drawn. The data for growth (Height, weight and head circumference) for each month of their life from the date of birth up to 24 months of age were included in the study. The descriptive indices and growth percentiles of these children were analyzed by SPSS15 and growth diagrams were drawn by EXCEL software.

Result

135 children were studied in the study including 64 girls (47.4%) and 71 boys (52.6%) 54 children (40%) were the first child of their families and 43 children (31.9%) were the second child and 16 children (11.9%) were the third child and only 16.3% were the fourth child or more. Mother's average age was 29.71±6.56 and fathers average age was 31.69±7.80. 21 of mothers (15.6%) were illiterate, 105 (77.7%) had elementary education and only 8.2% had junior high school studies or higher. 18 of the fathers (13.4%) were illiterate, 78.4% had elementary education and 8.2% had junior high school studies or upper. None of parents had academic education. 133 mothers (98.5%) were housewives and only two were economically active. 85 of fathers (63%) were farmers, 12 fathers (8.9%) were livestock breeder and 27.6% were busy in other jobs. The economic statuses of the studied families were poor and they

Table 1. Frequency Distribution and percentage of children below Third percentile of NCHS Growth standarad

	Below third standard percentile of Weight	Below third standard percentile of height	Below third standard percentile of Head circumference
At birth	10(19.2)*	4(7.7)	4(7.7)
One-month children	4(7.7)	3(5.8)	3(5.8)
Six-month children	5(9.8)	8(15.7)	2(3.9)
Ninth-month children	16(32.7)	8(16.3)	2(4.1)
Twelve-month children	24(53.3)	6(13.3)	1(2.2)
Eighteenth-month children	22(64.7)	7(20.6)	2(6.3)
Twenty-four-month children	10(43.5)	6(26.1)	1(5.9)

* number (percent)

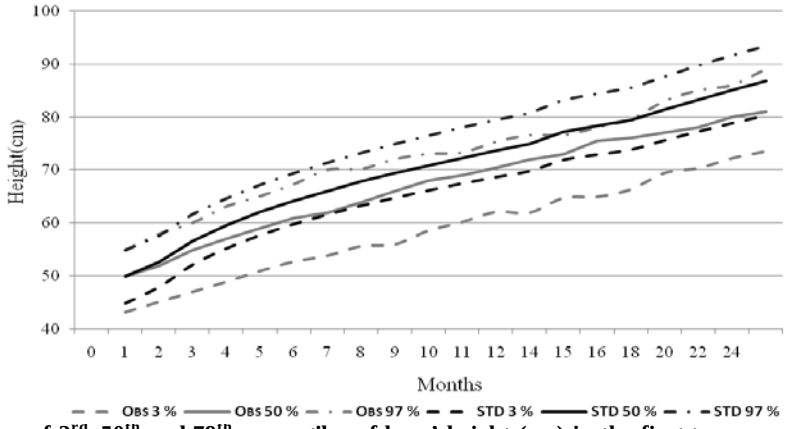

Diagram 1) The diagram of 3[ra], 50[tn] and 79[tn] percentiles of boys' height (cm) in the first two years of age compared with NCHS standard percentiles.

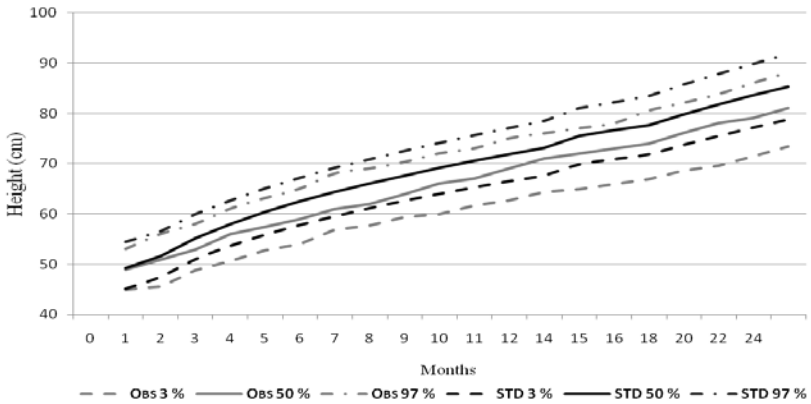

Diagram 2) The diagram of 3rd, 50th and 79th percentiles of girls' height (cm) in the first two years of age compared with NCHS standard percentiles.

normally faced inadequacy of foodstuffs. Housewives spent a short time of the year in other parts for cultivation, or harvesting agricultural crops or livestock breeding and granted their little children to their disabled or less able grandparents or their adolescent sisters and brothers or sometimes to their neighbors.

The results of studying children at the time of birth during 2004 to 2006 showed that 19.2% of the children (girls and boys) were below third NCHS standard percentile and weight. This ratio was (7.7%) in height and head circumference and had a better condition compared to weight Table 1. The ratio of children with the weight below third percentile of weight standard was higher in older ages as it was 53.3% in 12 month-children and 62% in 18-month children. Generally speaking height had a better condition compared to weight and corresponding percentages in the ages under study were lower. However these percentages which are expected to be near 3% are much higher and got higher in upper ages as the children reached 24 of months. In investigating the variable of head circumference and comparing it with third standard NCHS percentile a more suitable condition in weight and height variables and the percentages were so much approximate to 3% (Table 1).

In investigating boys' height percentiles it was found that in any of the percentiles height at birth is very close to standard percentile while as the age increases the distance of these percentiles goes farther than their corresponding percentile and the status of growth in this index gets worse. The third percentile has gone farther from standard values than two percentiles of 50th and 97th. (Diagram 1) Investigating girls' percentiles the same condition was seen(Diagram 2). Investigating the diagram of children' weight showed similar diagrams for girls and boys as the 3rd, 50th and 97th were very close to their corresponding NCHS standard percentiles. But the weight percentiles go far away from their corresponding percentiles. This event is much more evident in the ages above 12 months as it can be seen that in 15 months of age and more the children' weight 97th percentile drops down to below 50th percentiles and this is the same for boys and girls(Diagram 3&4).

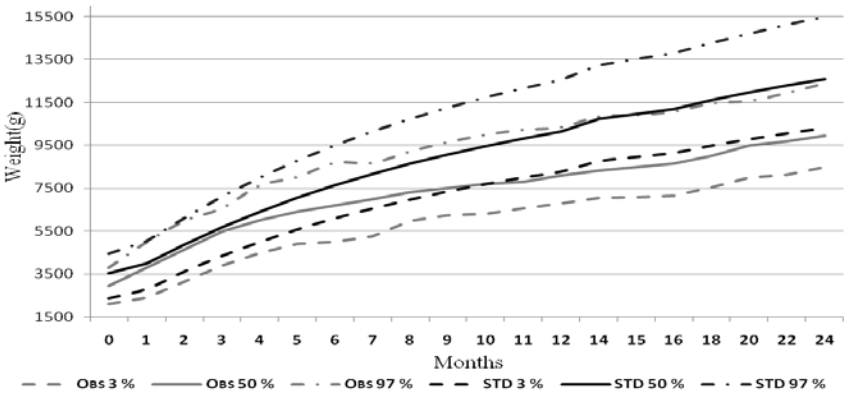

Diagram 3) The diagram of 3rd, 50th and 79th percentiles of boys' weight (gr) in the first two years of age compared with NCHS standard percentiles.

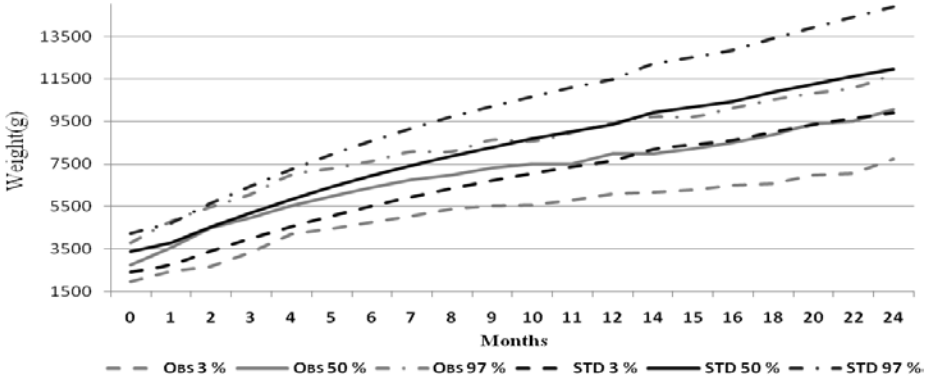

Diagram 4) The diagram of 3rd, 50th and 79th percentiles of girls' weight (gr) in the first two years of age compared with NCHS standard percentiles.

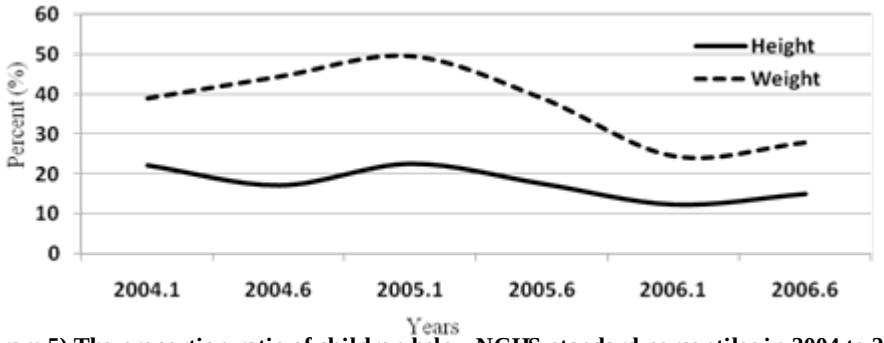

Diagram 5) The proportion ratio of children below NCHS standard percentiles in 2004 to 2006.

Studying general condition of height and weight during three years of study shows a sinus process in the status of the children. That is, the ratio of children below third percentile of growth in the first months of the year 2006 increased in weight and this increase reached to its highest level in the first months of 2005 and then decreased up to the ending months of the year 2006 and some growth can be seen in children below third percentile of weight. Studying children below third percentile of height also shows ups and downs similar to weight. The most ratio of the children below third percentile in height is in the early months of the year 2005and then decreases. Generally, the status of height based on the ratio of children below third percentile of age and weight is much better than the status of their weight (Diagram5).

Discussion

The findings show that 19.2% of the newborn, 7.7% in the first month, 9.8% in six month, 32.7% in 9 months, 53.3% in 12 month, 64.7% in 18 month and finally 43.5% in 24 month had a weight below third standard NCHS percentile .This generally shows the worsening condition of weight gaining of the children as their age increased specially after adding additive food to the infant's diet. Considering the severe poor economic condition of the region under study and parents' low level of education (none had academic education)and also children being kept by disabled or les-able people (disabled grandparents or adolescent sisters and brothers)or neighbors because their parents' inevitable migration, can be considered as probable reasons for this severe drop in growth. In the studies made by Hop *et al* on Vietnamese children (12) Yong *et al*. in Hon Kong (13) and Katto *et al*. In Japan (14) the delay in children's weight gaining stated from 6 to 12 month and continued up to 24 months of age. In the study made by Ferira *et al* made in 2006 on Brazilian rural children, all children below six months of age had a weight proportional with their age but 15.45of children between 6 to 12 months of age and 20% of 12-24 months of age had an inadequate weight against their age (15) some studies have shown that the weight or even height of urban children was higher compared to rural children. This can be due to reasons such as higher level of literacy, easier access to health and treatment services, easier access to complements and other required materials and things like that. In the study made by Engvin *et al*. in Vietnam, the weight of urban girls and boys between 3 months of age up to 12 months were 3.4 to 4.1% respectively and 7.2 to 10.5 % higher than rural boys and girls. The height of urban newborn was a little higher than rural newborn (16). In the study made by Ghamkhar *et al* made in Ahvaz none of the newborn children had a weight below third standard percentile but in their six months of age 0.8% of the boys and 1.8% of the girls , in 12 months of age, 1.7% of the boys and 4.1% of the girls, in 18 months of age , 10.8% of the boys and 2.2% of the girls and finally in 22 months of age 0.8 % of the boys and 7.4% of the girls had a weight below third percentile of standard(1). This is consistent with the results gained by this study from severe drop in growth from the age additive nutrition starts .However, the drop in weight gaining in their study was lower than the present study which can be due to reasons like the urbanization of community being studied, parents' different levels of education,(In the said study 45% of the studied mothers had secondary or academic education) In the study made by Hajian et al., (2) made in rural regions of Babol, the range of weight under third standard percentile in children between 1 to 24 months of age was at least 0.55 and at most 4.3% which is sharply different from the present study. The reasons previously mentioned such as low economic condition of the region being studied and parents' low level of education can explain this difference.

The findings of the study showed that 7.7% of the newborn, 5.8% in first month of age, 15.7% in six months of age, 16.3% in their 18 months of age and 26.1% in 24 months of age had a height below third NCHS standard percentile. Obviously, the least difference of weight with third standard percentile is at birth. Then gradually the inappropriate growth in height increases. In Ferira *et al* short stature compared to age did not exist in children below six months of age. But in ages between 6 to 12 months, it was 30.8% and in 12 to 24 months of age it was 20.8% (15). In the study made by Lorenko *et al*. made on urban Brazilian children in Amazon region, 19% of the children at birth to 5 months of age and 8.5% of the children in 12-23 months of age had short stature compared to their age but the children between 6 to 12 months of age had a height fit for their age(17). Since in the said studies, the height parameters are considered in relation to age, it is not possible to have a suitable comparison with the community being studied in the present study made according to NCHS standard percentiles. In another study made by Kangsim *et al* on Chilean children, only 3% of one –year old children had a height lower than fifth standard percentile(18). This is highly different from the present study. In the study made by Ghamkhar *et al* the number of children below third standard percentile in height evidently increased with increase in age. As 2.2% of the newborn boys and 1.2% newborn girls and in six months of age 1.7% of the boys and 10% of the girls , in 18 months of age , 4.7% of the boys and 13.5% of the girls had a height below third NCHS standard percentile(6). Showing a drop in height growth similar to the present study. However, this drop is sharper in the present study which can be due to reasons like financial affordability, level of education and different weight and head circumference at the time of birth. The study findings indicate a better condition of the children being studied from size and growth of head circumference as 7.7% of the newborn children had a circumference below third standard percentile .This amount reached 5.8%, 3.9% , 4.1% , 2.2% and 6.35 in first, six , 9, 12 and 18 months of age. In the study made by Bolurian *et al* made on children below one year of age in Sabzevar, the head circumference of 14% of the children was below NCHS third standard(19). In the study made by Namakin *et al* on children 1-24 months of age in Brigand, the head circumference percentile of the children being

studied conformed to NCHS percentiles (20).

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10/5/2012